

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION**

NANOCO TECHNOLOGIES LTD., §  
§  
*Plaintiff*, §  
§  
v. § Case No. 2:20-cv-00038-JRG  
SAMSUNG ELECTRONICS CO., LTD. §  
AND SAMSUNG ELECTRONICS §  
AMERICA, INC., §  
§  
*Defendants*. §

**MEMORANDUM OPINION AND ORDER**

Before the Court is the opening claim construction brief of Plaintiff Nanoco Technologies Ltd. (“Plaintiff”) (Dkt. No. 64, filed on February 12, 2021), the response of Defendants Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively “Defendant” or “Samsung”) (Dkt. No. 70, filed on February 26, 2021), and the reply of Plaintiff (Dkt. No. 71, filed on March 5, 2021). The Court held a claim construction hearing on March 26, 2021 (*see* Dkt. No. 75). Having considered the arguments and evidence presented by the parties at the hearing and in their claim construction briefing, the Court issues this Claim Construction Order.

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## I. BACKGROUND

Plaintiff brings suit alleging infringement of the following patents: U.S. Patent No. 7,803,423 (“the ‘423 patent”), U.S. Patent No. 7,588,828 (“the ‘828 patent”), U.S. Patent No. 8,524,365 (“the ‘365 patent”), U.S. Patent No. 7,867,557 (“the ‘557 patent”), and U.S. Patent No. 9,680,068 (“the ‘068 patent”) (collectively, “the Asserted Patents”). The Asserted Patents generally relate to nanoparticles. In particular, the ‘068 patent relates to a multi-phase polymer film for nanoparticles, while the remaining Asserted Patents relate to nanoparticles and methods of making same. All the Asserted Patents are owned by Nanoco Technologies Ltd.

The ‘423, ‘828, and ‘365 patents are entitled “Preparation of Nanoparticle Materials.” The ‘828 patent is a continuation-in-part of the application leading to the ‘423 patent. The ‘365 patent is a continuation of the application leading to the ‘423 patent. There is a high degree of overlap between the specifications of these patents. The Abstract of the ‘423 patent is reproduced below:

A method of producing nanoparticles comprises effecting conversion of a nanoparticle precursor composition to the material of the nanoparticles. The precursor composition comprises a first precursor species containing a first ion to be incorporated into the growing nanoparticles and a separate second precursor species containing a second ion to be incorporated into the growing nanoparticles. The conversion is effected in the presence of a molecular cluster compound under conditions permitting seeding and growth of the nanoparticles.

The ‘557 patent is entitled “Nanoparticles” and is not in the same patent family as the prior patents. The Abstract of the ‘557 patent is reproduced below:

Method for producing a nanoparticle comprised of core, first shell and second shell semiconductor materials. Effecting conversion of a core precursor composition comprising separate first and second precursor species to the core material and then depositing said first and second shells. The conversion is effected in the presence of a molecular cluster compound under conditions permitting seeding and growth of the nanoparticle core. Core/multishell nanoparticles in which at least two of the core, first shell and second shell materials incorporate ions from groups 12 and 15, 14 and 16, or 11, 13 and 16 of the periodic table. Core/multishell nanoparticles in which the second shell material incorporates at least two different group 12 ions

and group 16 ions. Core/multishell nanoparticles in which at least one of the core, first and second semiconductor materials incorporates group 11, 13 and 16 ions and the other semiconductor material does not incorporate group 11, 13 and 16 ions.

The ‘068 patent is entitled “Quantum Dot Films Utilizing Multi-Phase Resins,” and has a substantially different specification than the remaining patents. The ‘068 patent generally describes a multi-phase polymer film for quantum dots, and the preparation thereof. The Abstract of the ‘068 patent is reproduced below:

Multi-phase polymer films containing quantum dots (QDs) are described herein. The films have domains of primarily hydrophobic polymer and domains of primarily hydrophilic polymer. QDs, being generally more stable within a hydrophobic matrix, are dispersed primarily within the hydrophobic domains of the films. The hydrophilic domains tend to be effective at excluding oxygen.

## **II. LEGAL PRINCIPLES**

### **A. Claim Construction**

“It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude.’ ” *Phillips*, 415 F.3d 1303 at 1312 (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). The Court first examines a patent’s intrinsic evidence to define the patented invention’s scope. *Id.* at 1313–14; *Bell Atl. Network Servs., Inc. v. Covad Commc’ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). Intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *Phillips*, 415 F.3d at 1312–13; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004). The general rule—subject to certain specific exceptions discussed *infra*—is that each claim term is construed according to its ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the patent. *Phillips*, 415 F.3d at 1312–13; *Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003); *see also Azure Networks, LLC v. CSR PLC*, 771 F.3d 1336, 1347

(Fed. Cir. 2014) (“There is a heavy presumption that claim terms carry their accustomed meaning in the relevant community at the relevant time.”).

“The claim construction inquiry. . . begins and ends in all cases with the actual words of the claim.” *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998). “[I]n all aspects of claim construction, ‘the name of the game is the claim.’ ” *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1298 (Fed. Cir. 2014) (quoting *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998)). First, a term’s context in the asserted claim can be instructive. *Phillips*, 415 F.3d at 1314. Other asserted or unasserted claims can also aid in determining the claim’s meaning, because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term’s meaning. *Id.* For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id.* at 1314–15.

“[C]laims ‘must be read in view of the specification, of which they are a part.’ ” *Id.* (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995)). “[T]he specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’ ” *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). In the specification, a patentee may define his own terms, give a claim term a different meaning than it would otherwise possess, or disclaim or disavow some claim scope. *Phillips*, 415 F.3d at 1316. Although the Court generally presumes terms possess their ordinary meaning, this presumption can be overcome by statements of clear disclaimer. See *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1343–44 (Fed. Cir. 2001). This presumption does not arise when the patentee acts as his own

lexicographer. *See Irdet Access, Inc. v. EchoStar Satellite Corp.*, 383 F.3d 1295, 1301 (Fed. Cir. 2004).

“Although the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.” *Comark Commc’ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *see also Phillips*, 415 F.3d at 1323. “[I]t is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.” *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004).

The prosecution history is another tool to supply the proper context for claim construction because, like the specification, the prosecution history provides evidence of how the U.S. Patent and Trademark Office (“PTO”) and the inventor understood the patent. *Phillips*, 415 F.3d at 1317. However, “because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes.” *Id.* at 1318; *see also Athletic Alternatives, Inc. v. Prince Mfg.*, 73 F.3d 1573, 1580 (Fed. Cir. 1996) (ambiguous prosecution history may be “unhelpful as an interpretive resource”).

Although extrinsic evidence is useful, it is “less significant than the intrinsic record in determining the legally operative meaning of claim language.” *Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc.*, 388 F.3d at 862) (internal quotation marks omitted). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide

definitions that are too broad or may not be indicative of how the term is used in the patent. *Id.* at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition are not useful. *Id.* Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.*

## **B. Departing from the Ordinary Meaning of a Claim Term**

There are "only two exceptions to [the] general rule" that claim terms are construed according to their plain and ordinary meaning: "1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of the claim term either in the specification or during prosecution." *Golden Bridge Tech., Inc. v. Apple Inc.*, 758 F.3d 1362, 1365 (Fed. Cir. 2014) (quoting *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)); *see also GE Lighting Solutions, LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) ("[T]he specification and prosecution history only compel departure from the plain meaning in two instances: lexicography and disavowal."). "The standards for finding lexicography or disavowal are 'exacting.' " *GE Lighting Solutions*, 750 F.3d at 1309.

To act as his own lexicographer, the patentee must "clearly set forth a definition of the disputed claim term," and "clearly express an intent to define the term." *Id.* (quoting *Thorner*, 669 F.3d at 1365); *see also Renishaw*, 158 F.3d at 1249. The patentee's lexicography must appear "with reasonable clarity, deliberateness, and precision." *Renishaw*, 158 F.3d at 1249.

To disavow or disclaim the full scope of a claim term, the patentee's statements in the specification or prosecution history must amount to a "clear and unmistakable" surrender. *Cordis Corp. v. Boston Sci. Corp.*, 561 F.3d 1319, 1329 (Fed. Cir. 2009); *see also Thorner*, 669 F.3d at

1366 (“The patentee may demonstrate intent to deviate from the ordinary and accustomed meaning of a claim term by including in the specification expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope.”). “Where an applicant’s statements are amenable to multiple reasonable interpretations, they cannot be deemed clear and unmistakable.” *3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1326 (Fed. Cir. 2013).

### **C. Definiteness Under 35 U.S.C. § 112, ¶ 2 (pre-AIA) / § 112(b) (AIA)**

Patent claims must particularly point out and distinctly claim the subject matter regarded as the invention. 35 U.S.C. § 112, ¶ 2. A claim, when viewed in light of the intrinsic evidence, must “inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). If it does not, the claim fails § 112, ¶ 2 and is therefore invalid as indefinite. *Id.* at 901. Whether a claim is indefinite is determined from the perspective of one of ordinary skill in the art as of the time the application for the patent was filed. *Id.* at 911. As it is a challenge to the validity of a patent, the failure of any claim in suit to comply with § 112 must be shown by clear and convincing evidence. *BASF Corp. v. Johnson Matthey Inc.*, 875 F.3d 1360, 1365 (Fed. Cir. 2017). “[I]ndefiniteness is a question of law and in effect part of claim construction.” *ePlus, Inc. v. Lawson Software, Inc.*, 700 F.3d 509, 517 (Fed. Cir. 2012).

## **III. CONSTRUCTION OF AGREED TERMS**

Before the *Markman* hearing, the parties have agreed to the following meanings for the following terms. *See, e.g.*, Dkt. No. 61 (Joint Claim Construction Chart.)

TERM	AGREED CONSTRUCTION
“provided on” ‘828 patent (claims 1, 3–5, 8–13) ‘557 patent (all claims)	Plain and ordinary meaning.
“disposed on” ‘365 patent (all claims)	Plain and ordinary meaning.
“depositing … on” ‘557 patent (all claims)	Plain and ordinary meaning.

Accordingly, the Court adopts the constructions agreed to by the parties as listed above.

#### IV. CONSTRUCTION OF DISPUTED TERMS

The parties’ positions and the Court’s analysis as to the disputed terms within the claims of the Asserted Patents are presented below.

##### A. “molecular cluster compound”

Term	Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“molecular cluster compound” (‘828 patent, ‘557 patent)	“clusters of three or more metal atoms and their associated ligands of sufficiently well-defined chemical structure such that all molecules of the cluster compound possess approximately the same relative molecular formula”	<u>Indefinite</u> . If not indefinite, “clusters of 3 or more metal atoms and their associated ligands of sufficiently well-defined chemical structure such that all molecules of the cluster compound possess the same relative molecular mass, where ligand means an atom or group bound to a central atom of a complex”
“molecular cluster compound” (‘423 patent, ‘365 patent)	“clusters of 3 or more metal or non-metal atoms and their associated ligands of sufficiently well-defined chemical structure such that all molecules of the cluster compound possess the same relative molecular mass”	[same as above]

## **(1) The Parties' Positions**

Plaintiff argues that the patents provide express definitions for these terms, and that those definitions should be adopted as the construction for these terms. *See, e.g.*, Dkt. No. 64, Plaintiff's Opening Claim Construction Brief, at 6–10. Plaintiff argues that the term is not indefinite because the patentee defined the terms in the patents. *Id.* at 10–11. Plaintiff further argues that the use of metal or non-metal does not render the claims indefinite because the scope of the claims are reasonably certain to one of skill in the art. *Id.* at 12.

Defendant argues that the term is indefinite because there is no reasonable certainty around the boundaries of the term. *See, e.g.*, Dkt. No. 70, Defendant's Responsive Claim Construction Brief, at 5. In effect, Defendant argues that because lexicography is inapplicable, the term is indefinite because there is no commonly understood meaning for the term. *Id.* at 5–8. Defendant argues that there is no ordinary meaning for the term and the different patents use different definitions for the same term. *Id.* at 5. Defendant argues that the surrounding language regarding the alleged definition of the term does not support lexicography. *Id.* at 6. Defendant also argues that the term is indefinite because a person of skill in the art would not have known which of multiple, inconsistent meanings was correct. *Id.* at 8–12. Defendant argues that there is no plain meaning as to the term because some definitions require metal atoms, others require metal bonds, and others allow nonmetal atoms. *Id.* at 9. Defendant argues that this discrepancy in the definitions is not resolved by the patents' definitions, which are themselves contradictory. *Id.* at 9–10.

In its Reply, Plaintiff argues that the patentee did in fact provide an express definition of "molecular cluster compound" within the patents. *See, e.g.*, Dkt. No. 71, Plaintiff's Reply Claim Construction Brief, at 1–4. Plaintiff argues that the same claim term can have different meanings in different claims of the same patent or a different patent if that is the patentee's intent. *Id.* at 2.

Plaintiff argues that there is no requirement that an express definition cannot be consistent with the plain and ordinary meaning. *Id.* at 2–3. Plaintiff argues that the use of the phrase “relates to” in the patentee’s definition of the term does not preclude the phrase from being definitional. *Id.* at 3–4. Plaintiff also argues that the term “molecular cluster compound” is not indefinite because a person of skill in the art would understand what it means. *Id.* at 4–7.

## **(2) Analysis**

The parties dispute whether the “molecular cluster compound” term is indefinite and whether the same term has different meanings in different patents. Plaintiff argues that the patent specifications provide specific (and different) definitions to the terms that provide a lexicographical definition. Defendant disagrees and argues that because lexicography is not present, and because there is no commonly understood meaning for the term, that the term is indefinite. For the reasons below, the Court rejects Defendant’s indefiniteness argument and finds that a single construction across the patents-in-suit is most appropriate for this term.

The disputed term appears in all asserted claims of the ‘423, ‘828, ‘365, and ‘557 patents. The claim language is not particularly relevant to the dispute. Instead, the parties rely primarily on the specification, as well as extrinsic evidence.

The ‘423 patent provides a general definition of the “molecular cluster” term:

**‘Molecular cluster’ is a term which is widely understood in the relevant technical field but for the sake of clarity should be understood herein to relate to clusters of 3 or more metal or nonmetal atoms and their associated ligands of sufficiently well defined chemical structure such that all molecules of the cluster compound possess the same relative molecular mass.** Thus the molecular clusters are identical to one another in the same way that one H<sub>2</sub>O molecule is identical to another H<sub>2</sub>O molecule. The use of the molecular cluster compound provides a population of nanoparticles that is essentially monodisperse. By providing nucleation sites which are so much more well defined than the nucleation sites employed in previous work the nanoparticles formed using the method of the present invention possess a significantly more well defined final structure than

those obtained using previous methods. A further significant advantage of the method of the present invention is that it can be more easily scaled-up for use in industry than current methods. Methods of producing suitable molecular cluster compounds are known within the art, examples of which can be found at the Cambridge Crystallographic Data Centre ([www.ccdc.ca.ac.uk](http://www.ccdc.ca.ac.uk)).

‘423 patent, col. 5, ll. 3–24 (emphasis added). Of relevance to the parties’ dispute, the ‘423 patent provides a definition to the term as being clusters of 3 or more “metal or nonmetal atoms.” *See id.* The ‘365 patent is a continuation of the ‘423 patent and provides the same definition of the term. *See, e.g.*, ‘365 patent, col. 5, ll. 19–40.

The ‘828 patent is a continuation-in-part of the ‘423 patent and provides a different definition of the term:

**“Molecular cluster” is a term which is widely understood in the relevant technical field, but for the sake of clarity should be understood herein to relate to clusters of three or more metal atoms and their associated ligands of sufficiently well-defined chemical structure such that all molecules of the cluster compound possess approximately the same relative molecular formula.** (When the molecules possess the same relative molecular formula, the molecular clusters are identical to one another in the same way that one H<sub>2</sub>O molecule is identical to another H<sub>2</sub>O molecule.) The molecular clusters act as nucleation sites and are much better defined than the nucleation sites employed in other methods. The use of a molecular cluster compound may provide a population of nanoparticles that are essentially monodisperse. A significant advantage of this method is that it can be more easily scaled-up to production volumes when compared to other methods of nanoparticle generation. Methods of producing suitable molecular cluster compounds are known within the art, examples of which can be found at the Cambridge Crystallographic Data Centre ([www.ccdc.ca.ac.uk](http://www.ccdc.ca.ac.uk)).

‘828 patent, col. 3, ll. 28–48 (emphasis added). Of relevance to the parties’ dispute, the ‘828 patent provides a definition to the term as being clusters of 3 or more “metal atoms.” *See id.* The ‘557 patent is not a direct continuation of the ‘423 patent, and while it utilizes and claims a “molecular cluster compound,” it does not provide any definition of the term.

As discussed above, the ‘423, ‘365, and ‘828 patents state that a “molecular cluster compound” is widely understood in the relevant technical field. In regards to the parties’ specific

disputes as to this term, the ‘423 and ‘365 patents state that it is a cluster of 3 or more “metal or nonmetal atoms” with the same relative “molecular mass,” the ‘828 patent states that it is a cluster of 3 or more “metal atoms” with the same relative “molecular formula,” and the specification of the ‘557 patent is silent as to any definition of the “molecular cluster compound” term. Based on the different “definitions” in the patent specifications, the parties dispute whether there is a commonly understood definition for the term, whether the patentee acted as a lexicographer for the term, whether the term can have different meanings based on the different “definitions” within the patents, and whether the term is indefinite based on the different “definitions.”

The patent specifications illustrate various embodiments of a molecular cluster. All the embodiments depict a molecular cluster compound with three or more metal atoms. For example, Figures 2–6 of the ‘423 patent illustrate various embodiments of a molecular cluster compound each with three or more metal atoms. The specifications also reference that “the molecular clusters are identical to one another” in the same way one  $H_2O$  molecule is identical to another  $H_2O$  molecule. *See, e.g.*, ‘423 patent, col. 5, ll. 9–11; ‘365 patent, col. 5, ll. 25–28; ‘828 patent, col. 3, ll. 35–38, col. 6, l. 40, col. 11, ll. 28–29.

The parties also rely on extrinsic evidence in the form of dictionaries, treatises, and expert testimony. Plaintiff’s expert opines that the specifications’ definitions for the term are consistent and have little meaningful difference. Dkt. No. 64-6, ¶¶ 50–53. Plaintiff’s expert opines that “metal or non-metal atoms” could include atoms that some scientists do not consider to be true metals, but that can behave as metals in certain circumstances, such as metalloids. *Id.* at ¶ 52. Plaintiff’s expert opines that the distinction between metals and non-metals is inconsequential for these patents, and there is little meaningful difference between molecular formula and molecular mass. *Id.* at ¶¶ 51–53. Defendant relies heavily on extrinsic definitions for the “molecular cluster” term.

*See* Defendant’s Responsive Claim Construction Brief (Dkt. No. 70) at page 9. Most of the definitions require metal atoms or metallic bonding, while others appear to allow non-metal atoms. *See id.*; *see also* Dkt. No. 70-11 at 1363; Dkt. No. 70-12 at 5; Dkt. No. 70-15 at 135; Dkt. No. 70-16 at 46; Dkt. No. 70-31. Defendant’s expert opines that the “molecular cluster compound” did not have a plain and ordinary meaning at the time of the alleged invention, much less a known meaning of reasonably certain scope. Dkt. No. 70-2, ¶¶ 50–52.

It is well recognized that a patentee may set out a definition of a term and act as his own lexicographer. *See, e.g., Phillips*, 415 F.3d at 1316 (if a special definition is provided to a claim term by the patentee, the inventor’s lexicography governs). On balance, the Court finds that the patentee acted as a lexicographer for the “molecular cluster” term, and the definitions within the specifications should govern. The Court notes that the specifications use quotation marks around the word “molecular cluster”, which is a strong indicator of lexicography. *See Sinorgchem C. v. ITC*, 511 F.3d 1132, 1136 (Fed. Cir. 2007) (quotation marks are a strong indicator that what follows is a definition). The Court also notes that the specifications state that for the purposes of the patent and the sake of clarity, the term “should be understood herein to relate to . . .,” which is an indicator of lexicography. The fact that there is or may be a common meaning to the term does not change the fact that the patentee attempted to act as a lexicographer. Further, the fact that “relate” is used in the definition also does not change the fact that the patentee attempted to act as a lexicographer. On balance, the Court finds that the patentee acted as a lexicographer for the “molecular cluster” term in the ‘423, ‘365, and ‘828 patents.

Despite a finding of lexicography, two primary issues relating to lexicography remain: (1) what meaning shall be given to the term in the ‘557 patent, where there is no express definition in that patent, and (2) whether a single construction is warranted across all patents despite slightly

different definitions. On balance, the Court finds that a single construction for all relevant patents is most appropriate. First, Defendant argues that a single construction is appropriate if indefiniteness is not found. Thus, the Court’s construction is consistent with the approach taken by the Defendant. Second, while there are some differences in the different patent specification definitions, the Court finds that they are substantially the same and it is not clear what, if any, practical differences there are between the different definitions as to the disputes between the parties. For example, it is Plaintiff’s position that the differences between a construction with metal atoms versus metal and non-metal atoms is a distinction without a difference. Likewise, it is unclear what, if any, material difference there is between the use of “molecular formula” and “molecular mass.” Third, there is no compelling reason to have different constructions between the different patents, as they have substantially similar specifications and the disputed term is used in the same way in the claims across the patents. Fourth, despite the ‘557 patent not providing an express definition, one of skill in the art would have read the ‘557 patent in light of the other specifications—and the general understanding of that term in the art—to determine its meaning. Fifth, despite providing a definition in the specification, the specifications clearly state that the term has a widely understood meaning in the relevant technical field, which then attempts to define that understood meaning for “clarity” and the purposes of the patents. Applying that general understanding on the ‘557 patent and across the other patents is consistent with the general disclosures of the specifications.

To the extent a single construction is adopted, there are three differences in the parties’ constructions: (1) “metal” atoms versus “metal or non-metal” atoms, (2) “molecular formula” versus “molecular mass,” and (3) the embedded “ligands” word. First, the Court finds that a construction directed to “metal atoms” as opposed to “metal or non-metal atoms” is most

appropriate for multiple reasons. All or substantially all the embodiments in the specifications depict a molecular cluster compound with three or more metal atoms. The Court is not aware of a single embodiment in the patents that depicts only non-metal atoms. While there is some inconsistency in the definitions offered in the extrinsic evidence, on balance, the Court finds that the extrinsic evidence indicates a molecular cluster contains metal atoms or metallic bonding. Further, adopting a “metal atoms” construction is also consistent with the Defendant’s alternative construction. Still further, the Court notes that this construction does not preclude non-metal atoms from being part of the molecular cluster, but just that a molecular cluster must have a cluster of three or more metal atoms. Second, the Court finds the term “molecular formula” as opposed to “molecular mass” is most appropriate. By necessity, a compound with the same molecular formula will necessarily have the same molecular mass. The specification indicates that the molecules of the cluster compound need to be substantially identical, and Plaintiff admits as much. Further, it appears that the difference between a molecular formula and a molecular mass, at least for the purposes of this claim construction, is inconsequential. Third, the parties agree to the meaning of the embedded term “ligands,” but disagree whether an express definition should be included. In other words, there is no dispute between the parties as to the meaning of this “ligands” term, but they disagree as to what is needed for the claim construction. The Court need not separately define each embedded term within a term’s construction, particularly when the parties do not dispute the meaning of the term. Defendant provides no meaningful argument as to why it is necessary to include this separate definition in the overall construction of the term. Consistent with the parties’ constructions and the ordinary meaning of the term, the Court finds that the term “ligand” means “an atom or group bound to a central atom of a complex.” No further explanation or construction of the “ligands” term is necessary in the construction of the “molecular cluster compound” term.

For the above reasons, the Court finds that the term “molecular cluster compound” means “clusters of three or more metal atoms and their associated ligands of sufficiently well-defined chemical structure such that all molecules of the cluster compound possess the same relative molecular formula.”

The last issue is that of indefiniteness. In short, Defendant argues the “molecular cluster compound” term is indefinite because there is no commonly understood meaning for the term and the different patents use different definitions for the same term. The Court rejects Defendant’s arguments. While there is some variation between the definitions in the patent specifications and the extrinsic evidence, mere variation in the understanding of the term does not require a finding of indefiniteness. Further, just because a term has multiple definitions does not, by itself, mean that the term is indefinite. Indefiniteness does not require absolute certainty, but only reasonable certainty around the boundaries of the term. Further, the Court is not persuaded by Defendant’s citations to the prosecution history of the related patents to the patents-in-suit. As mentioned above, the Court finds that a single construction is most appropriate for the “molecular cluster compound” term across the relevant patents-in-suit. The Court finds that the definitions provided by the specifications is generally consistent with the extrinsic evidence. On balance, the Court does not find that the differences in the patent specifications or the extrinsic evidence render the term indefinite. The Court finds that one of skill in the art would be able to reasonably determine what is or is not a molecular cluster based on the Court’s construction, which is not an entirely subjective term. Further, the Court’s construction is substantially like that proposed by the Defendant—a construction which it does not argue is indefinite. Overall, the Court finds that there is no dispute that one of ordinary skill in the art would understand with “reasonable certainty” the scope of the invention and the bounds of the “molecular cluster compound” term. Accordingly, pursuant to the

Supreme Court's holding in *Nautilus*, the Court rejects Defendant's arguments that the claim when "read in light of the specification delineating the patent, and the prosecution history, fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." The Court finds that Defendant has failed to prove by clear and convincing evidence that the term is indefinite; accordingly, the Court rejects Defendant's indefiniteness arguments.

The Court hereby construes the term "**molecular cluster compound**," for the '828, '557, '423, and '365 patents, to mean "**clusters of three or more metal atoms and their associated ligands of sufficiently well-defined chemical structure such that all molecules of the cluster compound possess the same relative molecular formula.**"

**B. "wherein said[/the] conversion is[/being] effected in the presence of a[/the] molecular cluster compound"**

<u>Term</u>	<u>Plaintiff's Proposed Construction</u>	<u>Defendants' Proposed Construction</u>
"wherein said[/the] conversion is[/being] effected in the presence of a[/the] molecular cluster compound"  ('423 Patent, '828 patent (claim 14), '365 patent (claims 17–23), '557 patent)	Plain and Ordinary Meaning (no construction is needed)	"a molecular cluster compound acts as a seed or template to grow the nanoparticle core"

**(1) The Parties' Positions**

Plaintiff argues that the phrase is readily understandable and should be given its plain and ordinary meaning, as no construction is needed. *See, e.g.*, Dkt. No. 64, Plaintiff's Opening Claim Construction Brief, at 13–15. Plaintiff argues the claim language is clear and does not require the Defendant's construction. *Id.* at 13. Plaintiff argues that Defendant's construction impermissibly imports a preferred embodiment from the specification, and the specification clearly teaches that

the seeding mechanism is just one possible mechanism to form the nanoparticle and is not limited to such an embodiment. *Id.* at 14–15.

Defendant argues that the only disclosure in the patent is that the molecular cluster compound acts as a seed. *See, e.g.*, Dkt. No. 70, Defendant’s Responsive Claim Construction Brief, at 15–16. Defendant argues that Plaintiff wrongly contends that a molecular cluster compound may merely facilitate seeded growth without being a seed. *Id.* at 17. Defendant argues that the patents offer no alternate mechanism for nanoparticle growth other than the molecular cluster being the seed. *Id.*

In its Reply, Plaintiff argues that Defendant improperly attempts to assign a function to the molecular cluster compound, while the claims only require the compound to be present in the chemical reaction. *See, e.g.*, Dkt. No. 71, Plaintiff’s Reply Claim Construction Brief, at 7–8. Plaintiff argues that the invention is not bound by any one particular theory as to how the reaction occurs. *Id.* Plaintiff argues that the words are clear and require no construction. *Id.*

## **(2) Analysis**

The parties dispute whether the term has its plain and ordinary meaning. There is not a dispute as to the plain and ordinary meaning itself, but rather whether a different meaning to the term is warranted based on the specification. The primary issue is whether the disputed term is limited to the primary embodiment.

The disputed phrase appears in four of the patents-in-suit. Relevant portions of the exemplary claims are reproduced below:

**“effecting conversion** of a nanoparticle precursor composition to a material of the nanoparticles... **wherein said conversion is effected** in the presence of a molecular cluster compound different from the first precursor species and the second precursor species **under conditions permitting seeding and growth of the nanoparticles”** (‘423 patent, claim 1)

**“effecting conversion of the nanoparticle precursor into nanoparticles... wherein said conversion is effected in the presence of a molecular cluster compound incorporating group 12 ions and group 16 ions under conditions permitting nanoparticle seeding and growth”** (‘828 patent, claim 14)

**“effecting conversion of a nanoparticle precursor composition to the core semiconductor material... wherein the conversion is effected in the presence of the molecular cluster compound that is different from the first precursor species and the second precursor species and wherein the conversion is effected under conditions permitting seeding and growth of the nanoparticles”** (‘365 patent, claim 17)

**“effecting conversion of a nanoparticle core precursor composition to the material of the nanoparticle core... said conversion being effected in the presence of a molecular cluster compound different from the nanoparticle core precursor composition”** (‘557 patent, claim 1)

(emphasis added). The claim language only requires the “presence of” the molecular cluster compound ; the claim language itself does not require the disputed term to be the “seed.” Many of the relevant claims additionally require the claimed conversion to be done under “conditions permitting nanoparticle seeding and growth.”

The Abstracts of the patents-in-suit are not limiting, and merely state (in relevant part) that the conversion of a nanoparticle precursor is affected in the “presence of” a molecular cluster compound under conditions permitting seeding and growth of the nanoparticles. *See, e.g.,* Abstract of the ‘423, ‘365, and ‘557 patents. However, the patent specifications often describe the molecular cluster compound acting as a seed in the context of a description of the invention:

In accordance with embodiments of the invention, conversion of a precursor composition to nanoparticles is effected in the presence of a molecular cluster compound. **Molecules of the cluster compound act as a seed or nucleation point upon which nanoparticle growth may be initiated.** In this way, a high-temperature nucleation step is not required to initiate nanoparticle growth because suitable nucleation sites are already provided in the system by the molecular clusters. **The molecules of the cluster compound act as a template to direct nanoparticle growth.** (‘828 patent, col. 3, ll. 18–28)

Embodiments of the invention involve the large-scale synthesis of III-V quantum dots (nanoparticles) whereby a **seeding molecular cluster** is placed in a solvent

(coordinating or otherwise) in the presence of other precursors to initiate particle growth. Moreover, the **seeding molecular cluster is employed as a template** to initiate particle growth from other precursors present within the reaction solution. **The molecular cluster used as a seed** can either consist of the same elements as those required in the subsequent quantum dot or different elements that are not required in the final quantum dots but facilitate the seeding process. In accordance with embodiments of the current invention, **the molecular cluster to be used as the seeding agent** is either prefabricated or produced in situ prior to acting as a seeding agent. ('828 patent, col. 4, ll. 41–54)

**The invention consists of the use of molecular clusters as templates to seed the growth of nanoparticles**, whereby other molecular sources “molecular feedstocks” are used to facilitate particle growth. These molecular feedstocks are a combination of separate precursors each containing one or more element/ion required within the as to be grown nanoparticles. ('423 patent, col. 7, ll. 40–45)

The invention includes the use of molecular clusters, whereby the clusters used are identical molecular entities as compared to nanoparticles, which inherently lack the anonymous nature of molecular clusters in an assembly. **The clusters act as “embryo-type” templates for the growth of nanoparticles** whereby other molecular sources precursors contribute ions to the growth process and thus clusters subsequently grow into particles. ('423 patent, col. 11, ll. 32–41)

The current invention concerns the large scale synthesis of nanoparticles by the reaction whereby a **seeding molecular cluster** is placed in a dispersing medium or solvent (coordinating or otherwise) in the presence of other precursors to initiate particle growth. **The invention uses a seeding molecular cluster as a template** to initiate particle growth from other precursors present within the reaction medium. The molecular cluster to be used as the seeding agent can either be prefabricated or produced in situ prior to acting as a seeding agent. ('557 patent, col. 3, ll. 54–63)

(emphasis added). Likewise, Figure 2 of the '828, '423, and '365 patents depict a molecular cluster used as a seeding agent. There is no dispute between the parties that the primary embodiment in the patents describes using the molecular cluster compound as a seed to form the nanoparticle core.

However, the specification also teaches that the seeding aspect of the molecular cluster is not the only way the invention can work. For example, the '423 patent states that the molecular cluster acting as a seed is only one possible mechanism by which nanoparticle growth may take place:

Without wishing to be bound by any particular theory, one possible mechanism by which nanoparticle growth may take place is that each identical molecule of the cluster compound acts as a seed or nucleation point upon which nanoparticle growth can be initiated. In this way, nanoparticle nucleation is not necessary to initiate nanoparticle growth because suitable nucleation sites are already provided in the system by the molecular clusters.

‘423 patent, col. 4, l. 61–col. 5, l. 2. Likewise, the ‘828 patent mentions that the molecular cluster compound need only “facilitate” a seeding reaction. *See* ‘828 patent, col. 6, ll. 42–45, col. 11, ll. 32–35. Other disclosures within the specifications are likewise not limiting. For example, the ‘423 patent teaches that the conversion is carried out under conditions to ensure that there is either direct reaction and growth between the precursor composition and cluster, or some clusters grow at the expense of others. *See* ‘423 patent at col. 5, ll. 25–31, col. 11, ll. 52–55; *see also* ‘828 patent, col. 4, ll. 61–65. Still further, many of the Abstracts merely state (in relevant part) that the conversion of a nanoparticle precursor is affected in the “presence of” a molecular cluster compound under conditions permitting seeding and growth of the nanoparticles. *See, e.g.*, Abstract of the ‘423, ‘365, and ‘557 patents.

Defendant’s arguments and citations to the intrinsic evidence are not persuasive. First, the claim language does not require the limitations proposed by the Defendant. Nothing in the claim requires the molecular cluster compound to be the seed or template itself. Instead, many of the claims simply require that the conversion is affected “under conditions permitting seeding and growth of the nanoparticles.” In other words, the claim language itself merely requires conditions permitting seeding and growth but does not actually require the molecular cluster compound itself to be the seed. Defendant’s proposed construction would render this additional language superfluous. Second, the Court is not persuaded by Defendant’s reliance on the prosecution history from related patents, which are not particularly helpful for this dispute. Third, Defendant’s relied

upon portions of the specification do not otherwise equate or limit the “molecular cluster compound” to the limitations proposed by the Defendant. While the specification certainly mentions the preparation of nanoparticles by using a molecular cluster compound that acts as a seed, that language does not rise to the level of a disclaimer, particularly with other non-limiting disclosures. For example, the ‘423 patent expressly states that the seed is only one possible mechanism by which nanoparticle growth may take place. ‘423 patent, col. 4, ll. 61–col. 5, l. 2. Such permissive language indicates that the molecular cluster itself is not necessarily restricted to a seed. On balance, the Court does not find the specification as limiting as argued by the Defendant. Fourth, even if the only embodiment in the patents is a molecular cluster compound that is the seed, the Court finds that the examples in the specification are non-limiting embodiments of the invention that should not be imported into the claims. The Federal Circuit has consistently held that “particular embodiments appearing in the written description will not be used to limit claim language that has broader effect.” *Innova/Pure Water*, 381 F.3d at 1117. Even where a patent describes only a single embodiment, absent a “clear intention to limit the claim scope,” it is improper to limit the scope of otherwise broad claim language by resorting to a patent’s specification. *Id.*; see also *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) (citing numerous cases rejecting the contention that the claims of the patent must be construed as being limited to the single embodiment disclosed and stating that claims are to be given their broadest meaning unless there is a clear disclaimer or disavowal); *Comark Commc’ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1988) (“Although the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.”); *Arlington Indus., Inc. v. Bridgeport Fittings, Inc.*, 632 F.3d 1246, 1254 (Fed. Cir. 2011) (“even where a

patent describes only a single embodiment, claims will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words of expressions of manifest exclusion or restriction.”); *Phillips*, 415 F.3d at 1323.

Overall, the Court rejects Defendant’s arguments. On its face, the claim language is clear. The claim language does not require the limitations proposed by Defendant. Further, the Court finds that there is no lexicography, disavowal, or disclaimer in the specification to require the limitations suggested by Defendant and rejects Defendant’s arguments to the contrary. The Court finds that while the molecular cluster can be used as the seeding agent, it does not have to be the seed itself. The relevant claim language merely requires conditions permitting nanoparticle seeding and growth—it does not require the molecular cluster itself to necessarily act as the seed. The Court finds that one of ordinary skill in the art, based upon the specification and the claims, would understand the disputed term to have its plain and ordinary meaning.

Because this resolves the dispute between the parties, the Court finds that no other terms within the disputed phrase require further construction. *See U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997) (“Claim construction is a matter of resolution of disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims, for use in the determination of infringement. It is not an obligatory exercise in redundancy.”); *see also O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) (“[D]istrict courts are not (and should not be) required to construe every limitation present in a patent’s asserted claims.”) (*citing U.S. Surgical*, 103 F.3d at 1568).

The Court hereby construes the phrase “**wherein said[/the] conversion is[/being] effected in the presence of a[/the] molecular cluster compound**” to have its **plain and ordinary meaning**.

### C. “first semiconductor material”

<u>Term</u>	<u>Plaintiff’s Proposed Construction</u>	<u>Defendants’ Proposed Construction</u>
“first semiconductor material” ('557 Patent)	Plain and Ordinary Meaning (no construction is needed)	“a material having a narrower band gap than the core and second semiconductor material”

#### (1) The Parties’ Positions

Plaintiff argues that the phrase is readily understandable and should be given its plain and ordinary meaning, as no construction is needed. *See, e.g.*, Dkt. No. 64, Plaintiff’s Opening Claim Construction Brief, at 16–17. Plaintiff argues that the patent does not define or give any special meaning to the term and does not require the first semiconductor material to have a narrower band gap than the core and second semiconductor material. *Id.* Plaintiff argues that Defendant’s construction unnecessarily restricts the claims to only quantum-dot-quantum-well (QDQW) structures. *Id.* at 17.

Defendant argues that the invention is limited to QDQW nanoparticles, and because QDQW nanoparticles have a specific core / multi-shell structure, then the first shell has a narrower band gap. *See, e.g.*, Dkt. No. 70, Defendant’s Responsive Claim Construction Brief, at 20. Defendant argues that every example in the patents is a QDQW structure, and thus the claims cannot be construed to cover non-QDQW structures. *Id.* at 20–22.

In its Reply, Plaintiff argues that the specification does not limit the invention to a QDQW nanoparticle. *See, e.g.*, Dkt. No. 71, Plaintiff’s Reply Claim Construction Brief, at 8–9. Plaintiff argues that the title, the Abstract, and the specification’s first description of the “present” invention all lack any reference to band gaps or QDQWs, and there is no reference in the prosecution history

that distinguished the invention. *Id.* Plaintiff argues that this term should be given its plain and ordinary meaning. *Id.* at 9.

## **(2) Analysis**

The parties dispute whether plain and ordinary meaning applies or whether the claim—and the claim term—is limited to a particular structure based on the specification. In particular, the parties dispute whether the claim is limited to a quantum dot-quantum wells (QDQW) structure. It does not appear disputed that the general understanding of a QDQW structure has a narrower band gap of the first shell layer of the nanoparticle. Thus, if the claim is limited to a QDQW structure, Defendant argues that the first layer of a QDQW structure necessarily has a narrower band gap than the core and the second semiconductor material, consistent with the general understanding of a QDQW structure.

The disputed term appears in the ‘557 patent. Claim 1 is the only independent claim of the ‘557 patent, which is reproduced below:

A method for producing a nanoparticle comprised of a core comprising a core semiconductor material, a first layer comprising a **first semiconductor material** provided on said core and a second layer comprising a second semiconductor material provided on said first layer, said core semiconductor material being different to said **first semiconductor material** and said **first semiconductor material** being different to said second semiconductor material, the method comprising:

effecting conversion of a nanoparticle core precursor composition to the material of the nanoparticle core;

depositing said first layer on said core; and

depositing said second layer on said first layer, said core precursor composition comprising a first precursor species containing a first ion to be incorporated into the growing nanoparticle core and a separate second precursor species containing a second ion to be incorporated into the growing nanoparticle core,

said conversion being effected in the presence of a molecular cluster compound different from the nanoparticle core precursor composition.

(emphasis added). Based on the claim language, claim 1 requires the core of a nanoparticle particle to comprise a first layer with a first semiconductor material and a second layer with a second semiconductor material. The claim also requires the first semiconductor material to be different than a material of the core and the second semiconductor material. Nothing in the claim language limits the claimed nanoparticle to a QDQW structure. Nothing in the claim language mentions a “band gap” of the materials or the core or first or second layers of the nanoparticle. Nothing in the claim language requires the first layer to have a narrower band gap than the second layer and the core.

Defendant’s arguments rely primarily on the specification. The Title of the ‘557 patent is simply “Nanoparticles,” and the Abstract of the ‘557 patent mentions core / multi-shell nanoparticles (and first and second shell materials) but does not reference a QDQW structure. However, many other portions of the specification do reference a QDQW structure and a primary embodiment of the ‘557 patent is a QDQW structure. Some of the Defendant’s best examples in the specification are listed below:

    The current invention describes the design and preparation methods of a number of unique **quantum dot-quantum wells nanoparticles** including, ...

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    Another drive for designing and producing specific **quantum dot-quantum well structures** in this invention is the current need for quantum dots free of elements (e.g. cadmium and mercury) which are deemed by national authorities to be toxic or potentially toxic but which have similar optical and/or electronic properties to those of CdSe—ZnS core-shell quantum dots. The current invention includes the design and synthesis of a number of cadmium free **QD-QW structures** based on II-VI/I-III-VI<sub>2</sub>/II-VI, III-V/II-V/III-V materials such as but not restricted to ...

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The present invention is directed to the preparation of a number of semiconductor nanoparticles which may be considered as falling within the class of materials known as **quantum dot-quantum wells** and includes materials within the size range 2–100 nm. The present invention describes the architecture and the preparation of a number of nanoparticles materials and includes a number of compound semiconductor particles otherwise referred to as **quantum dots-quantum well**, include material comprising ...

\* \* \* \* \*

Semiconductor nanoparticles are also known as nanocrystals or quantum dots and generally possess a core surrounded by at least one shell of semiconductor material. Nanoparticles comprising a core and a plurality of shells are known as core/multi-shell nanoparticles. An important class of core/multi-shell nanoparticles are **quantum dot-quantum wells** which possess an architecture whereby there is a central core of one material overlaid by another material which is further over layered by another material in which adjacent layers comprise different semiconductor materials.

‘557 patent, col. 11, ll. 62–67; col. 13, ll. 28–38; col. 15, ll. 42–57; col. 17, l. 63–col. 18, l. 5 (emphasis added). It also appears undisputed that the figures of the ‘557 patent illustrate QDQW structures and the primary embodiment of the patent is a QDQW structure.

Defendant’s arguments and citations to the specification are not persuasive. First, the claim language does not require the limitations proposed by the Defendant. Nothing in the claim limits the nanoparticle to a QDQW nanoparticle or structure. Nothing in the claim references the band gaps of the semiconductor materials, much less limits the first semiconductor material to a narrower band gap. Defendant relies on nothing in the prosecution history to show that the claims were allowed based on being a QDQW structure, nor that the band gap of the first semiconductor material was at issue in the claims. Second, Defendant focuses on the specification references to a QDQW nanoparticle as opposed to what the specification teaches on the “first semiconductor material.” Third, Defendant’s relied upon portions of the specification do not otherwise equate or limit the “first semiconductor material” to the limitations proposed by the Defendant. While the

specification certainly mentions the preparation of nanoparticles that may be considered QDQW structures in some instances, that language is generally not restrictive or limiting, and does not rise to the level of a disclaimer. For example, the specification mentions the preparation of nanoparticles “which may be considered as falling within” the class of materials referred to as quantum dots-quantum wells (col 15, ll. 43–47), that the nanoparticles “includes” particles referred to as quantum dots-quantum wells (col 15, ll. 48–51), and that “an important class” of core / multi-shell nanoparticles are quantum dot-quantum wells (col. 17, l. 67–col. 18, l. 1). Such permissive language indicates that the nanoparticle itself is not necessarily restricted to a QDQW structure. On balance, the Court does not find the specification as limiting as argued by the Defendant. Fourth, even if all of the working examples and figures in the ‘557 patent disclose a QDQW structure, the Court finds that the examples in the specification are non-limiting embodiments of the invention that should not be imported into the claims. The Federal Circuit has consistently held that “particular embodiments appearing in the written description will not be used to limit claim language that has broader effect.” *Innova/Pure Water*, 381 F.3d at 1117. Even where a patent describes only a single embodiment, absent a “clear intention to limit the claim scope,” it is improper to limit the scope of otherwise broad claim language by resorting to a patent’s specification. *Id.*; *see also Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) (citing numerous cases rejecting the contention that the claims of the patent must be construed as being limited to the single embodiment disclosed and stating that claims are to be given their broadest meaning unless there is a clear disclaimer or disavowal); *Comark Commc’ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1988) (“Although the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.”); *Arlington*

*Indus., Inc. v. Bridgeport Fittings, Inc.*, 632 F.3d 1246, 1254 (Fed. Cir. 2011) (“even where a patent describes only a single embodiment, claims will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words of expressions of manifest exclusion or restriction.”); *Phillips*, 415 F.3d at 1323.

Overall, the Court rejects Defendant’s arguments. On its face, the claim language is clear. The claim language does not require the limitations proposed by Defendant. Further, the Court finds that there is no lexicography, disavowal, or disclaimer in the specification to require the limitations suggested by Defendant and rejects Defendant’s arguments to the contrary. The Court finds that one of ordinary skill in the art, based upon the specification and the claims, would understand the disputed term to have its plain and ordinary meaning. The parties’ dispute is not on the plain and ordinary meaning of the term, but rather whether a specific limitation exists based on the specification.

Because this resolves the dispute between the parties, the Court finds that no other terms within the disputed phrase require further construction. *See U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997) (“Claim construction is a matter of resolution of disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims, for use in the determination of infringement. It is not an obligatory exercise in redundancy.”); *see also O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) (“[D]istrict courts are not (and should not be) required to construe every limitation present in a patent’s asserted claims.”) (*citing U.S. Surgical*, 103 F.3d at 1568).

The Court hereby construes the term “**first semiconductor material**” to have its **plain and ordinary meaning**.

#### D. “emulsion”

<u>Term</u>	<u>Plaintiff’s Proposed Construction</u>	<u>Defendants’ Proposed Construction</u>
“emulsion” (‘068 patent, claim 1)	Plain and Ordinary Meaning (no construction is needed)  If construction is necessary, the P&OM is the following: “a mixture of two or more immiscible liquids, in which one liquid is dispersed in another liquid.”	“a suspension of two or more immiscible liquid phases, in which one liquid phase is dispersed in another liquid phase”

##### (1) The Parties’ Positions

Plaintiff argues that the phrase is readily understandable and should be given its plain and ordinary meaning, as no construction is needed. *See, e.g.*, Dkt. No. 64, Plaintiff’s Opening Claim Construction Brief, at 18–21. Plaintiff argues that the term is used in accordance with its plain and ordinary meaning. *Id.* If a construction is needed, Plaintiff provides a construction that it argues is the plain and ordinary meaning based on multiple dictionary definitions and extrinsic evidence. *Id.* at 18–19. Plaintiff argues that Defendant’s inclusion of the terms “suspension” and “phase” adds confusion and redundancy and Plaintiff argues that its construction using “mixing” is more accurate and less confusing. *Id.* at 19–20.

Defendant argues that its construction is required because there is a dispute between the parties as to the plain and ordinary meaning of the term. *See, e.g.*, Dkt. No. 70, Defendant’s Responsive Claim Construction Brief, at 23. Like the Plaintiff, Defendant provides a construction that it argues is the plain and ordinary meaning based on multiple dictionary definitions and extrinsic evidence. *Id.* at 23–26. Defendant argues that the “phases” limitation is consistent with the claim language, the specification, and the plain meaning of the term. *Id.* at 23–24. Defendant argues that its “phase” construction is necessary to make it clear that the liquids remain distinct and separate (as phases) after the emulsion is formed. *Id.* at 24. Defendant argues that “suspension”

is more accurate than “mixture,” and that a “suspension” is accurate with the claim language, the specification, and the plain meaning of the term. *Id.* at 25. Defendant argues that a “mixture” describes how the emulsion is formed, not the emulsion itself, and a “mixture” does not necessarily require two separate phases. *Id.* at 25–26.

In its Reply, Plaintiff argues that an emulsion is a scientific term with a well understood meaning and should have its plain and ordinary meaning. *See, e.g.*, Dkt. No. 71, Plaintiff’s Reply Claim Construction Brief, at 9. Plaintiff argues that the word “mixture” best captures the patent’s own description of an emulsion, is consistent with dictionary definitions, and is simple for the jury to understand. *Id.* at 10. Plaintiff argues that the term “suspension” is harder to understand for the jury and should not be adopted. *Id.* at 10–11. Plaintiff also argues that the word “phase” would provide no clarity and invite confusion. *Id.* at 11. Plaintiff argues that there is nothing in the specification or file history where the word “phase” is used to define the term “emulsion,” and is thus an unnecessary limitation to the claim term. *Id.* at 11–12.

## **(2) Analysis**

The parties dispute the plain and ordinary meaning of the term. Both parties seem to agree that the plain and ordinary meaning applies, but dispute what is the most appropriate plain and ordinary meaning of the term based on the disclosures within the patent. The parties dispute two issues on the plain and ordinary meaning of the term: (1) whether an emulsion is more appropriately considered a “mixture” or a “suspension,” and (2) whether the use of liquid “phase” in the construction is necessary or appropriate.

The ‘068 patent contains one claim, which is reproduced below:

A method of preparing a film, the method comprising: forming an **emulsion** comprising a *first phase* that comprises a first polymer and quantum dots and a

*second phase* that comprises a second polymer; depositing the emulsion between gas barrier sheets to form a film; and curing the first and second polymers.

(emphasis added). The claim requires forming and depositing the emulsion, and that the emulsion comprises a first phase and a second phase.

Each party relies on a host of extrinsic evidence (mostly dictionary definitions) in support of their competing proposals for the best meaning of an “emulsion.” *See, e.g.*, Plaintiff’s Opening Brief (Dkt. No. 64) at 18–20; Dkt. No. 64-7 at ¶¶ 54–56; Defendant’s Responsive Brief (Dkt. No. 70) at 26–27; Dkt. No. 70-2 at ¶ 107. Some of the definitions mention a stable “mixture,” others mention a “suspension,” while still others mention a “dispersion.” *See id.* Further, each party relies on an expert declaration in support of its position. Plaintiff’s expert opines that an “emulsion” is a well-known term in chemistry and has an ordinary and customary meaning that is well recognized in the art. Dkt. No. 64-7 at ¶ 53. In his declaration, Plaintiff’s expert describes Figure 3 of the ‘068 patent as showing “a colloidal dispersion of one liquid in another.” *Id.* at ¶ 58. Defendant’s expert opines that a mixture does not include the phase separation that is the hallmark of an emulsion, and the term “suspension” is well supported in the specification and various dictionary definitions. Dkt. No. 70-2 at ¶¶ 108–111.

The specification references both a “mixture” and a “suspension.” In the Summary section, the specification mentions that the quantum dots are suspended in a first solution and that the quantum dot suspension is added to a second solution to yield an emulsion. ‘608 patent, col. 2, ll. 14–24. The specification also mentions mixing a phase 1 resin with a phase 2 resin to form an emulsion, such that the mixture forms an emulsion of phase 1 resin suspended in phase 2 resin. *Id.* at col. 5, ll. 26–50. The specification has numerous references to a phase 1 polymer / resin and a phase 2 polymer / resin that forms the emulsion. As one example, the specification illustrates a

two-phase film of Figure 3 in the patent as having a QD-compatible phase and an oxygen-excluding phase. *Id.* at col. 2, ll. 38–40. The specification does not expressly define the “emulsion” term and does not use the term “emulsion” in a manner inconsistent with its plain and ordinary meaning. The specification does not disclaim or otherwise limit the scope of the emulsion term.

On balance, the Court finds that a plain and ordinary construction of the term is most appropriate. The “emulsion” term is not defined in the specification. The “emulsion” term is used in the claim and specification in a manner consistent with its plain and ordinary meaning. The Court finds that one of ordinary skill in the art, based upon the specification and the claims, would understand the “emulsion” term to have its plain and ordinary meaning. Nevertheless, to resolve the dispute between the parties, the Court finds that a construction as to the term is necessary and helpful.

Regarding the dispute between “mixture” and “suspension,” both have some support in the specification and extrinsic dictionary definitions. During the claim construction hearing, it became clear that one of the disputes regarding this dispute was the “stability” of the emulsion. Defendant argued that a stable dispersion is a suspension, and that a mere mixture of two items does not necessarily create an emulsion. Both parties agree that an “emulsion” is a type of dispersion—i.e., a liquid “dispersed” in another liquid. Numerous dictionary definitions cited by both parties define an emulsion to be a “colloidal dispersion.” *See, e.g.*, Dkt. No. 64-7 at ¶ 56; Dkt. No. 70-2 at ¶ 107. Further, in his declaration, Plaintiff’s expert described Figure 3 of the ‘068 patent as showing “a colloidal dispersion of one liquid in another.” Dkt. No. 64-7 at ¶ 58. Based on the intrinsic and extrinsic evidence, the Court finds that the phrase “colloidal dispersion” most accurately reflects the plain and ordinary meaning of the term and resolves the dispute between the parties.

Regarding the dispute as to the inclusion of the term “phase” in the construction of “emulsion,” the Court is not persuaded by Defendant’s arguments. The claim language already specifies that the emulsion comprises a first phase and a second phase. It is not clear to the Court why addition of “phases” is useful or necessary for the “emulsion” term. The parties agree that the two liquids are “immiscible” with each other. The Court finds that additional use of “phases” in the emulsion term would be redundant and/or superfluous to the rest of the claim language.

During the claim construction hearing, the Court proposed “a colloidal dispersion of two or more immiscible liquids.” Defendant agreed to this construction; Plaintiff conceded to its expert. However, as mentioned above, Plaintiff’s expert has already described the illustrated emulsion within the ‘068 patent (Fig. 3) as depicting “a colloidal dispersion.”

The Court hereby construes the term “**emulsion**” to mean “**a colloidal dispersion of two or more immiscible liquids.**”

#### E. “polymer”

<b><u>Term</u></b>	<b><u>Plaintiff’s Proposed Construction</u></b>	<b><u>Defendants’ Proposed Construction</u></b>
“polymer” (‘068 patent, claim 1)	“a polymerized or polymerizable substance”	Plain and Ordinary Meaning  If construction is necessary, the P&OM is the following: “a molecule composed of repeating subunits”

#### (1) The Parties’ Positions

Plaintiff argues that the term “polymer” is broader than its plain and ordinary meaning based on its usage within the patent specification. *See, e.g.*, Dkt. No. 64, Plaintiff’s Opening Claim Construction Brief, at 22–25. Plaintiff argues that the term polymer, based on the disclosure within the patent, applies not just to polymers, but to any polymerizable substance or material. *Id.* Plaintiff

argue that Defendant's construction would exclude the LMA embodiment from the claims, which is rarely correct. *Id.* at 24. Plaintiff argues that its construction of polymer is consistent with the specification and the claim language. *Id.* at 25.

Defendant argues that the phrase is readily understandable and should be given its plain and ordinary meaning, as no construction is needed. *See, e.g.*, Dkt. No. 70, Defendant's Responsive Claim Construction Brief, at 27–28. If a construction is needed, Defendant provides a construction that it argues is the plain and ordinary meaning based on multiple dictionary definitions and extrinsic evidence. *Id.* Defendant argues that nothing in the patent shows that “polymer” has been redefined to encompass more than the plain meaning of the term; the claim language does not refer to monomers or polymerizable substances—it is limited to polymers. *Id.* Defendant argues the fact that the claim excludes certain embodiments in the specification does not change the scope of the issued claim. *Id.* at 29.

In its Reply, Plaintiff argues that its construction is consistent with the teachings of the patent. *See, e.g.*, Dkt. No. 71, Plaintiff's Reply Claim Construction Brief, at 12. Plaintiff argues that the patentee clearly demonstrated an intent to include both polymerized and polymerizable substances as “polymer” phases. *Id.* at 13. Plaintiff argues that the term “resins” are not used more broadly than “polymers” in the patent. *Id.* at 14. Plaintiff also argues that the patentee did not give up claim scope during prosecution of the patent. *Id.* at 14–15.

## **(2) Analysis**

The parties dispute whether the “polymer” term has its plain and ordinary meaning. There is not a dispute as to the plain and ordinary meaning itself, but rather whether a different meaning (polymer or polymerizable substance) to the term is warranted based on the specification.

The ‘068 patent contains one claim, which is reproduced below:

A method of preparing a film, the method comprising: forming an emulsion comprising a first phase that comprises a **first polymer** and quantum dots and a second phase that comprises a **second polymer**; depositing the emulsion between gas barrier sheets to form a film; and curing the **first and second polymers**.

(emphasis added). The claim requires that the first phase comprises a first polymer and the second phase comprises a second polymer. Nothing in the claim language indicates a meaning other than a plain and ordinary meaning as to the “polymer” term.

The specification has many references to “ polymers,” such as “multi-phase polymer films,” “hydrophobic polymer,” “hydrophilic polymer,” “polymer material,” “polymer resins,” “polymer film,” “polymer,” and “polymer phase.” The specification also separately references terms such as “resins.” The specification discloses forming an emulsion with a phase 1 resin / phase 2 resin or a phase 1 polymer / phase 2 polymer. *See, e.g.*, ‘068 patent, col. 5, ll. 13–59. Various working examples are disclosed, including using lauryl methacrylate (LMA) to form the phase 1 resin. *See, e.g.*, col. 5, l. 60–col. 7, l. 62. Nothing in the specification indicates a meaning other than a plain and ordinary meaning as to the “polymer” term.

Plaintiff’s arguments and citations to the specification are not persuasive. First, the claim language does not require the construction proposed by the Plaintiff. The claim language simply states polymer. The claim does not state polymer material, polymer substance, polymerizable substance, resin, or monomer. Had the patentee wanted to specifically broaden the claim as proposed by Plaintiff, it could have easily done so in the claim by using a different word. Second, nothing in the specification indicates a special meaning was intended for the term polymer. The specification does not equate the term “polymer” to a broader and different word, much less one that includes any “polymerizable substance.” Plaintiff fails to point to anything in the specification that specifically disclaims or defines the “polymer” term in the manner proposed by Plaintiff. The

fact that LMA is used in working examples in the specification does not necessarily mean that a polymer must necessarily include an LMA; indeed, the references to LMA in the specification are in the context of a phase 1 resin and nowhere does the specification equate LMA to a polymer.

Overall, the Court rejects Plaintiff's arguments. On its face, the claim language is clear. The claim language does not require the limitations proposed by Plaintiff. In effect, Plaintiff is asking the Court to re-write the claim language, which the Court rejects. Further, the Court finds that there is no lexicography, disavowal, or disclaimer in the specification to require the broadened definition suggested by Plaintiff and rejects Plaintiff's arguments to the contrary. Simply put, the patentee used the term "polymer" in the claims, and the term "polymer" has a well understood meaning. Nothing in the intrinsic record suggests departing from that ordinary meaning. The Court finds that one of ordinary skill in the art, based upon the specification and the claims, would understand the "polymer" term to have its plain and ordinary meaning.

Nevertheless, to resolve the dispute between the parties, on balance, the Court finds that a construction as to the term is necessary and helpful. Plaintiff does not dispute that Defendant's construction is the plain and ordinary meaning for the term. The Court finds that Defendant's construction is consistent with the extrinsic evidence and accurately reflects the plain and ordinary meaning of the term.

The Court hereby construes the term "**polymer**" to mean a "**a molecule composed of repeating subunits.**"

## **V. CONCLUSION**

The Court adopts the above constructions set forth in this opinion for the disputed terms of the patents-in-suit. The parties are ordered that they may not refer, directly or indirectly, to each other's claim construction positions in the presence of the jury. Likewise, the parties are ordered

to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court, in the presence of the jury. Any reference to claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

**SIGNED this 10th day of May, 2021.**



ROY S. PAYNE  
UNITED STATES MAGISTRATE JUDGE